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2) Nancy
3) returning to me*
DEPARTMENT OF ARCHITECTURE

Proposal to Add an Area of Concentration called:

FEB 4 1986

Media Arts and Sciences

OFFICE OF THE HEAD

To the Department of Architecture's PhD Program in
Art, Architecture, and Environmental Studies

January 30, 1986

It is proposed to set up a new field of advanced study, to be called Media Arts and Sciences, in the Architecture Department. At present 15 doctoral students in Architecture are working in an experimental program at the Media Laboratory, under supervision of faculty members there. We believe that the nature of their work is sufficiently distinct to warrant creating a new field of study. The following text describes the overall five year plan for degrees in this area.

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Professor Nicholas Negroponte

Ph.D. Requirements for the Proposed Field of Media Arts and Sciences

January 30, 1986

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PART I

DEGREE REQUIREMENTS

Proposed Ph.D. Program

The Media Arts and Sciences section of the Department of Architecture offers two programs of graduate study: an experimental program for Doctoral Studies and a Master of Science in Visual Studies. The following sets out the requirements for an "official" area of concentration to be added to the existing Ph.D. in the Department of Architecture.

1.0 Admission

Admission of students to all programs of graduate study will be decided by a meeting of the entire faculty affiliated with the Media Laboratory.

2.0 Surveillance

Each student is assigned an advisor on enrollment. The advisor is expected to meet regularly with the student and to file a written report once a semester which will be available to the faculty.

The progress of doctoral candidates will be reviewed by a Ph.D. committee appointed by faculty at the Media Laboratory. The committee will appoint the student's advisor on enrollment, approve changes of advisor, and approve student's plans of study and thesis proposals. The committee will formally examine each student's progress at least once a year and more frequently if the student's advisor has indicated unsatisfactory progress.

3.0 Residence

We anticipate a norm of 4 years of full-time residence for a student coming directly from undergraduate studies to obtain a Ph.D. The first two years are a qualifying period: Students will satisfy Institute requirements for residence and credit, attend two consecutive years of the Ph.D. pro-seminar (see below) and, during the fourth semester, present an SM thesis and pass a Ph.D. qualifying examination. Research for a Ph.D. thesis is expected to take two more years, however the period is not formally specified.

Students who are admitted as Ph.D. candidates, after obtaining the MIT SM in Media Arts and Sciences (degree name change is being proposed), may present themselves for the qualifying examination at any time in the next two semesters.

They may also present their Ph.D. thesis at the end of the fourth semester after admission as Ph.D. candidates. Such students will be required to attend the Ph.D. pro-seminar for a full, two-year cycle.

Students who have another SM degree will normally be required to be in residence for one qualifying year and pass the qualifying examination in the second semester. At least one further year of residence will be required before presenting the Ph.D. thesis. They will be required to attend a two year cycle of the Ph.D. pro-seminar.

4.0 Specialization

Students will choose during their first year an area of specialization approved by the Ph.D. committee. The initial set of areas is:

- Electronic Media
- Computer Graphics
- Epistemology and Learning
- Computer Music
- Image and Signal Processing
- Spatial Imaging

5.0 Course Requirements

5.1 Institute Requirements

5.2 A plan of study for each semester approved by the advisor

5.3 Pro-Seminar

and the DCGS

A Ph.D. candidate must attend a Pro-Seminar in Media Arts and Science for four consecutive semesters.

6.0 General Examination

6.1 Content

and the DCGS

The qualifying examination covers three areas chosen by the student with his advisor and approved by the Ph.D. committee. One of these will be examined in greater depth and will normally become the field of specialization of the thesis research. Guidelines for the other two "supporting" topics follow:

The first supporting topic is in an area that provides technological, mathematical or similar underpinnings for the area of specialization; the second supporting topic is in a field of study that places the area of specialization in a larger social, psychological, philosophical or historical perspective.

The following examples of acceptable supporting topics are intended only to illustrate the intention of the concept of supporting topics:

If the specialization is Computer Music: (1) advanced signal processing; mathematical function theory (2) history of music; psychology of perception.

If the specialization is in Epistemology and Learning : (1) artificial intelligence; computer languages or architecture (2) philosophy or sociology of knowledge

6.2 Form of Examination

The examination will be conducted by an examining committee consisting of specialists in the three areas of the exam. The composition of the committee will be proposed by the student and approved at a meeting of faculty at the Media Laboratory. Normally the committee will include at least two MIT faculty members of whom at least one is in the Media Lab. The study requirements in each area will be formalized in a written agreement with the appropriate committee member.

The examination will have an oral and a written component. The former will include a meeting of the student and all three members of the committee. The latter will include an overnight "take-home" examination on the supporting topics and the writing of a paper "of publishable quality" in the principal topic.

The normal time for the examination is at the end of the second year of study.

7. Theses

The Ph.D. thesis is required to make an original contribution to knowledge in one of the areas of specialization recognized in the Media Laboratory.

Students will submit to the Ph.D. committee a thesis plan which will name a thesis advisor and two readers. At least one of the three must be a faculty member in the Media Laboratory. The plan will include a thesis proposal that has been approved by the thesis advisor.

The thesis proposal is expected to be a substantive piece of work showing familiarity with the field of research and presenting a plausible argument for an original approach to a well-defined outstanding problem. (Ideally it should be a publishable paper.)

It is in the nature of the field that certain research requires team collaboration and access to special resources. It is anticipated that a Ph.D. thesis might be based on research that is part of a larger project. However, in such cases the thesis must clearly delimit the contribution to knowledge attributable directly to its author.

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The SM thesis need not make an original contribution to knowledge but must show familiarity with the methods of research in the selected area and must be written in a form that would satisfy the requirements of leading journals in its field. Its presentation should reflect the fact that it is a product of a Media Technology center.

8.0 Thesis Examination

After submission of the thesis there will be a public thesis defense under the chairmanship of the thesis advisor.

9.0 Title of Degree

The title will be proposed by the student and approved by the Department of Architecture's Ph.D. Committee, after review by faculty affiliated with the Media Laboratory.

10.0 Action in Cases of Unsatisfactory Progress

When the Ph.D. committee considers that a student is not making satisfactory progress, they will first ask the advisor to inform the student. If the problem continues for another semester, the chairman will write to the student stating the problem and offering the student an opportunity to meet with the committee. In those cases where a student does not have an SM, serious consideration will be given to making such a terminal degree.

Part II

Media Arts and Sciences: A New Disciplinary Area

The proposal of the new Ph.D. program reflects the emergence of a new disciplinary area: Media Arts and Sciences.

The use of technologies as media of expression and communication is as old as human culture: as old as cave paintings, smoke signals, and drum language. With time, technological media proliferated and became more sophisticated. The printing press, piano, camera, blackboard, telephone, radio, television, and arcade games are all examples. But the diversity of media technologies is not in itself synonymous with the idea of Media Arts and Sciences as a discipline of study. Quite the contrary, it is hard to see that the classical designers of pianos, school equipment, and printing presses had much more in common than the general affinities shared by all creative craftsmen. As recently as ten or twenty years ago the industries devoted to printing, to education, and to musical instruments shared little in their intellectual or theoretical foundations. The situation has changed. This paper is based on the thesis that we are witnessing the birth of a new disciplinary area. It proposes a further step to nurture its development from "inter-disciplinary" to "disciplinary" status by formally recognizing it as a field of doctoral studies in the Department of Architecture to be called Media Arts and Sciences.

Media Arts and Sciences as an area of research is already acknowledged at MIT by the existence of the Media Laboratory. Active research groups which have grown up in various laboratories and departments at MIT have chosen to move into a common space and share common resources in the continued pursuit of their goals in computer graphics, education, electronic publishing, advanced television, holography, interface technologies, personal computers, photography, and film/video. These groups include seven tenured faculty members. The full list of faculty and senior research scientists is appended in the dedication booklet.

The creation of the Media Laboratory is both less and more than an "interdisciplinary merger." None of these groups have given up their intellectual integrity to become part of something else. The laboratory provides natural neighbors for groups of specialists who have come together as a federation. Nevertheless, we expect something new to emerge that will transcend the component elements. This expectation reflects a complex appreciation of contemporary technological and cultural history. In its simplest form this expresses a clearly discernible trend towards increasing the overlap of the constituent areas.

The "obvious" facet of the overlap is an increasing use of computers (and related technologies) in the areas represented. But there is much more to it. The use of a computer as a tool to do more efficiently work that could be done before is important but does not in itself constitute a change in the nature of a user discipline. In Media Arts and Sciences much more is happening: the computers are not merely being helpful; they are changing the nature of the activities they are helping. They are changing them in ways that draw increasingly on common intellectual as well as technological perspectives.

Consider two examples: journalism and education. There is a dramatic shift in perspective. In the past both of these professions have tended to be anti-individualist in their concern for satisfying the needs of large classes of people. A newspaper must contain articles that will appeal to millions. A school curriculum formalizes the knowledge everyone is expected to possess. In both cases the first uses of the new technologies exemplify the general rule about what to do with something new: assimilate it to the old, use it to do better what you are already doing. But in each case, the ultimate impact of the technologies is to open the door to qualitatively new opportunities for individualization. In place of newspapers written to be read by large populations, we can now envisage a service designed to give individuals the information or entertainment they actually want in the style they actually like it--a personalized news service. And instead of a textbook written for the generic child, we can envisage educational programs for individual people. Achieving these visions poses formidable technical problems. But more than this, it requires a different way of thinking. This different way of thinking is at the heart of the Media Laboratory.

The spirit of the laboratory is to combine techniques and sensitivities drawn from engineering, from the arts, and from the human sciences. The technological focus is exemplified by the work in advanced television led by Professor William Schreiber and by research in holography led by Professor Stephen Benton. The focus on artistic values is exemplified by the Experimental Music Studio led by Professor Barry Vercoe, the Visible Language Workshop led by Professor Muriel Cooper, and the Film/Video section led by Professor Richard Leacock. The group most heavily engaged in the human sciences is the Learning and Epistemology section led by Professor Seymour Papert. But such separations of focus must be seen in a dialectical spirit. We describe ourselves in this way as a first approximation for people looking in from the outside and also to make it clear that people coming into the lab will bring and maintain the intellectual and aesthetic standards of their own disciplines. But in reality, engineering, the arts and the human sciences penetrate widely through the laboratory. A high priority for the director, Professor Nicholas Negroponte, and the entire faculty is to nurture this interpenetration.

The design of our program of advanced study grapples with the dialectic of bringing together research from different disciplines but imbued with a common perspective. No student will graduate without satisfying the standards of professionalism and intellectual excellence of one of the constituent disciplines. In addition, we expect our graduate students to go further than people of our older generation in making a personal synthesis of the elements brought together in the laboratory.

Part III

The Curriculum: An Emerging Program

There is a chicken and egg element in the design of any new academic program. In established disciplines, such as mathematics, no one feels the need to define the subject area. This is a good thing too since it is hard to imagine an acceptable abstract definition of "mathematics." In practice, it is easy enough to say what mathematics is by referring to what mathematicians do. Media Arts and Sciences has to use the same method: a set of faculty members constitute the first approximation to a definition. They also constitutes the definition of the "curriculum."

The development of the graduate program reflects the way we see the evolution of the discipline itself. At the beginning it is bound to be more of a mixture of separate disciplines than a new chemical compound; we see it moving over a few years towards greater integration. Thus, in the present "experimental program" we have students whose interests lie in electronic communication media, in education, and in music. In each of these areas there is a tenured faculty member--Nicholas Negroponte, Seymour Papert, and Barry Vercoe respectively, and a number of others--non-tenured faculty and research scientists--capable of giving leadership to students. We expect to admit students in subsequent years in other areas of specialization such as image and signal processing, spatial imaging (holography), and computer graphics.

Three strategies make the program possible at present levels of faculty count and at present levels of integration of the groups in the Media Laboratory.

The first strategy is drawing on established courses at MIT and at Harvard which provide material well matched to some (but not all) of the needs of our students.

The second is keeping the number of students small enough in the first few years to be sure that every student can be given more than the usual attention by faculty. Much of the students' learning can be in an apprenticeship style. The number of students will be kept within bounds set by the number of faculty members and the available opportunities for more formal study in structured courses.

The third is adopting the development of new subjects as a major focus of interest in which students as well as faculty participate.

The way students can make use of MIT and Harvard is apparent in what students are doing this year. All the students are required to enroll in a pro-seminar (4.259). In addition, they draw on two kinds of courses: other courses offered by faculty members in the program itself and a larger offering of courses at MIT and Harvard.

The latter include subjects from courses 4,6,21 (music), and STS at MIT, a course in philosophy at Harvard and a reading course on Human Development at the Harvard Graduate School of Education.

New subjects being developed within the laboratory "bridge" fall into three categories:

"Bridge subjects" designed to initiate students without advanced technological background to the "technology culture," and those without a background in human sciences to an understanding of the methodologies of these disciplines. Professors Benton, Papert, and Wiesner have a strong personal commitment to this work.

A gradually expanding offering of specialized courses in the various areas so Media Arts and Sciences is represented by the faculty members in the lab.

We see as a serious intellectual endeavor the gradual development of a subject we will eventually be able to call "Media Arts and Sciences". In the meantime the pro-seminar (mentioned previously) for our graduate students serves as an evolving first approximation.

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